

*IXODES CALIFORNICUS* BANKS, 1904, *IXODES PACIFICUS*  
N. SP., AND *IXODES CONEPATI* N. SP.

(Acarina: Ixodidae)\*

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*IXODES CALIFORNICUS* BANKS

This tick was described by Banks (1904, Proc. California Academy Sciences, 3d Ser., Zool., Vol. III, No. 13, p. 369, Plate XLI, Fig. 57) from "several specimens" found on a bird, "*Toxostoma crissalis*," at Claremont, California (Baker). The author apparently believed the specimens to be females for he states, "Length ♀ 4 mm."

Through the kindness of Dr. Joseph C. Baequaert we have had an opportunity to examine the type material from the Museum of Comparative Zoology, Harvard University. It was found that the lot contains 5 nymphs. Because of the absence of females, an attempt was made to locate further type material in the California Academy of Sciences, but without success. Through Dr. Bequaert we have learned that Mr. Banks now considers it very likely that he saw only nymphs when he described *californicus* and that all of the specimens were in fact nymphs. Banks' description and figures of the nymphs made in 1904 are entirely adequate for the recognition of the specimens. These nymphs are specifically different from those of the tick which has been generally accepted as *californicus*. They suggest *I. brunneus* Koch, 1844, the nymph of which has never been adequately described and figured. Whether *californicus* will eventually fall as a synonym of *brunneus* can be determined only when nymphs of *brunneus* are available for study.

Banks in 1908 (A Revision of the Ixodoidea, or Ticks of the United States, Bureau of Entomology, Technical Series, No. 15, p. 24) redescribed *Ixodes californicus* Banks on the basis of a male and female from specimens taken in Claremont, Santa Clara County, Santa Cruz Mountains, and Redwood Creek, Humboldt County, all of California, and the hosts given are gray fox and black-tailed deer. His redescrptions and figures were ade-

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\* Contribution from the Rocky Mountain Laboratory (Hamilton, Montana) of the Division of Infectious Diseases of the National Institute of Health.

quate for the recognition of the common *Ixodes* of the Pacific Coast and the name *californicus* has since been erroneously used for this tick, which is now described as *Ixodes pacificus* n. sp.

### *Ixodes pacificus* Cooley and Kohls, new species

#### Female

*Body.* Capitulum, scutum and legs brown-black. Unfed, body nearly elliptical. Scutum reaching about half the length. Post-scutal areas with numerous long hairs. Lateral folds distinct, narrow. Length, from scapulae to posterior margin, 2.64 mm.; width, 1.14 mm. Fully fed specimens are a little wider and swollen behind and may reach 9.0 mm. in length.

*Capitulum.* Length, from posterior corners to tip of hypostome, 0.84 mm.; width of basis just posterior to the palpi, 0.45 mm. Basis with an even, convex curvature on top, lateral margins abrupt, converging posteriorly. Posterior margin a concave line, salient; cornua absent. Porose areas oval or sub-triangular, separated by less than the length of one. Surface smooth, shagreened, shining. Palpi long, bluntly rounded apically; lateral margins nearly straight, median margins curved. Article 2 longer than 3. Combined length of 2 and 3, 0.6 mm. Surface of palpi faintly shagreened, punctate and with a few hairs which are short except for two or three long ones near the base on the median side. In ventral view the basis is evenly curved, broadly rounded and salient behind; transverse sutural line visible. Auriculae mild as short ridges. Palpi flattened medially. Article one with the inner plate visible as a triangular point.

*Hypostome.* Long, rounded apically. Denticles 3/3 for most of the length but 4/4 in the distal portion; more visible in specimens mounted in balsam. Lateral denticles longest and pointed; median files with the denticles progressively smaller and rounded. Length about 0.54 mm.

*Scutum.* Slightly longer than wide, widest at about the middle. Posterior border broadly rounded. Scapulae pointed, moderate in length. Sizes from 1.26 mm. x 1.14 mm. to 1.44 mm. x 1.36 mm. Lateral carinae never distinct but traceable in some specimens. Cervical grooves usually visible only in reflected light as long, shallow depressions which are first convergent, then divergent and terminate before reaching the postero-lateral border. Surface shagreened throughout. Punctations fine and numerous. Hairs long and large, confined usually to longitudinal bands in the median and the lateral areas. Hairs on the scutum very similar to those on the postscutal area but usually a little longer.

*Legs.* Smooth and shagreened. Tarsi long, tapering, and with subapical humps very small on I, absent on all others. Ventral hairs on legs long and spinelike. Haller's organ on I distant from

the distal end. Length of tarsus I, 0.84 mm.; metatarsus, 0.50 mm. Length of tarsus IV, 0.82 mm.; metatarsus, 0.54 mm.

*Coxae*. Smooth, mildly convex, with very long hairs and with posterior edges salient. Internal spur on I long, tapering and pointed; absent on II, III and IV, but on II III there are salient corners. External spurs short on all coxae.

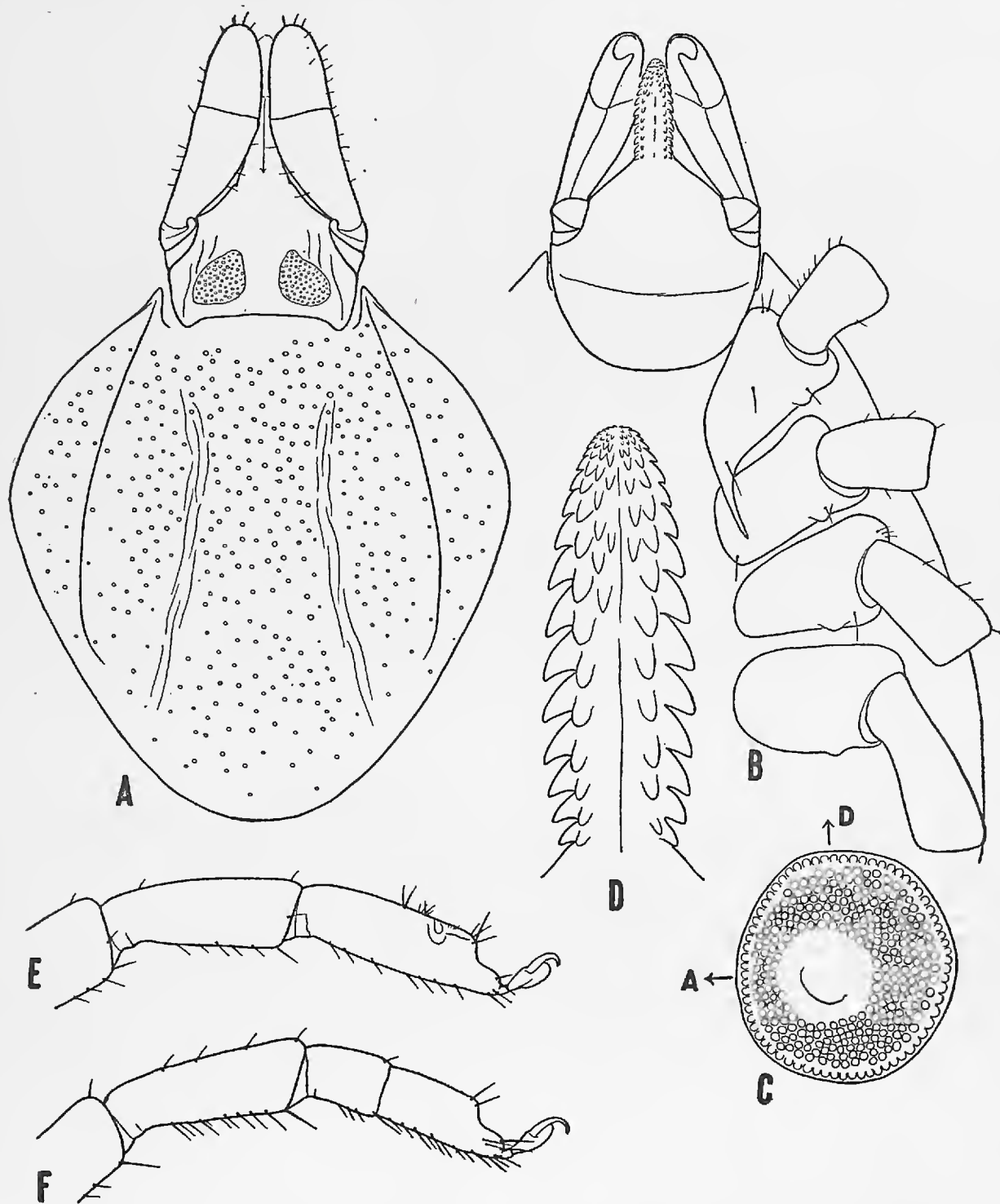


Figure 1. Female *Ixodes pacificus* Cooley and Kohls. A. Capitulum and scutum, dorsal. B. Capitulum and coxae, ventral. C. Hypostome. D. Spiracular plate. E. Tarsus and metatarsus of leg I. F. Tarsus and metatarsus of leg IV. G. Shape, replete specimen.

*Spiracular plate.* Suboval, with the longer axis transverse and with the nearly level surface well elevated over the body surface. Goblets moderate in number and size. Size about 0.3 mm. x 0.27 mm.

*Sexual opening.* Placed between coxae IV.

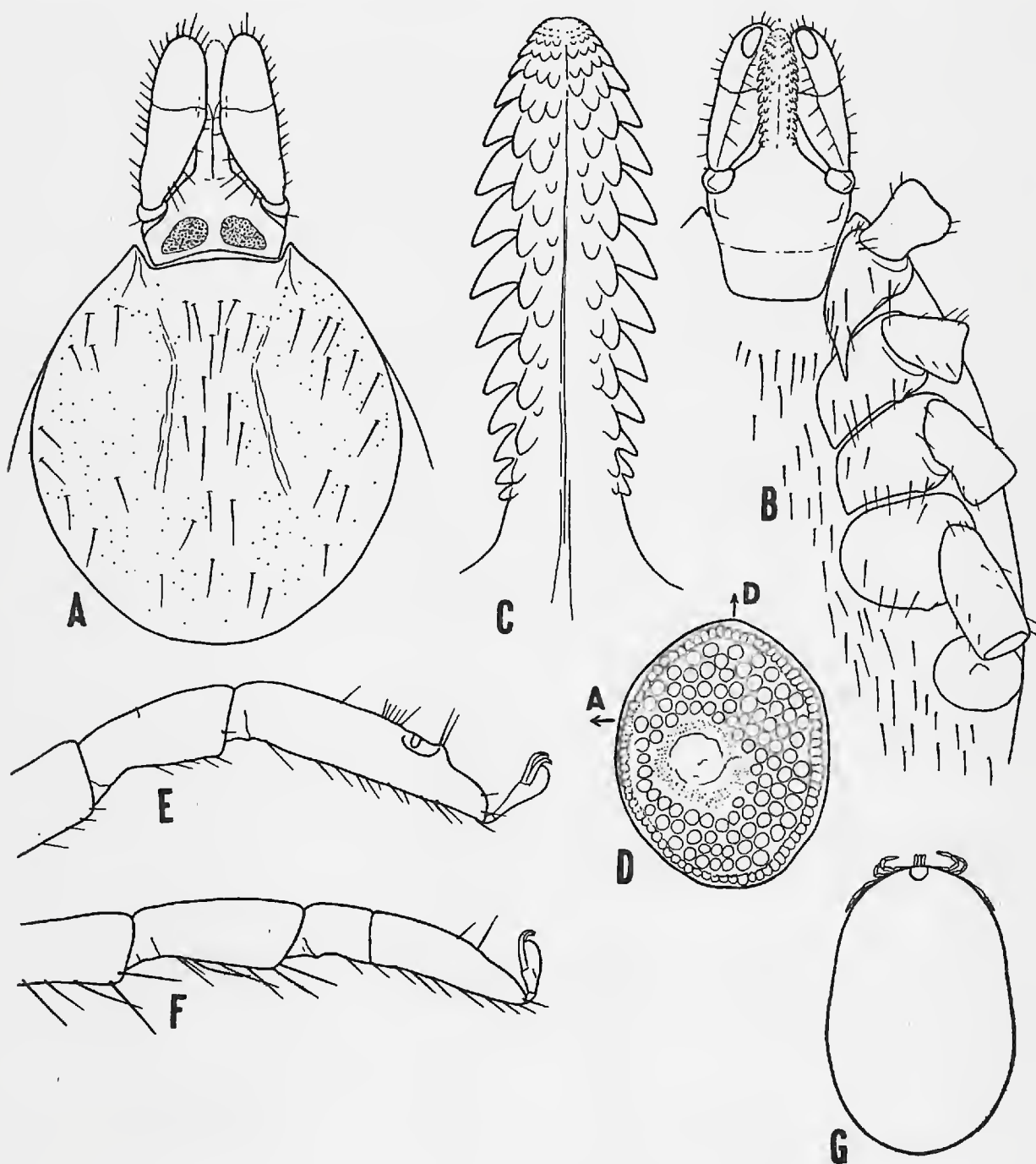


Figure 2. *Ixodes pacificus* Cooley and Kohls. A. Male capitulum and body, dorsal. B. Male capitulum and coxae, ventral. C. Male spiracular plate. D. Male hypostome. E. Male tarsus and metatarsus of leg I. F. Male tarsus and metatarsus of leg IV. G. Nymph, capitulum and scutum, dorsal. H. Nymph, capitulum and coxae, ventral. I. Nymph hypostome. J. Nymph spiracular plate. K. Nymph tarsus and metatarsus of leg I. L. Nymph, tarsus and metatarsus of leg IV.

## Male

*Body.* Oval, a little wider behind. Length, from scapulae to posterior border, 2.19 mm.; width, 1.32 mm.

*Capitulum.* Basis flattened (mildly convex) edges salient at the sides and behind; lateral borders convergent behind. Cornua absent. Surface punctate. Palpi broad, rounded apically, and with article 2 depressed dorsally. Article 1 simple. Hairs short excepting about three on the median side of article 2. In ventral view the basis is short and with a salient point behind. Auriculae present as lateral ridges. Palpi flattened medially and with the ventral edge in line with a mild tooth on inner plate of article 1.

*Scutum.* Length 2.04 mm.; width, 1.02 mm. Surface about equally convex on both ends. Pseudoscutum usually not visible but if visible then broadly rounded behind. Scapulae long, bluntly pointed and round on top. Hairs numerous and long, similar to those on the lateral folds; each hair arising from a depression which directs the supine hair backward. Punctations numerous, fine. The surface in general faintly shagreened.

*Hypostome.* Large and with large lateral denticles, those near the base larger, directed posteriorly and well raised above the surface of hypostome. The small median denticles as diagonal crenulations. Length about 0.33 mm.

*Ventral plates.* Median plate three times as long as the anal plate. Pregenital plate not clearly defined. Punctations on all plates numerous and fine, shallow. Hairs on all plates fine and numerous.

*Legs.* Essentially as in the female but with metatarsus on leg I relatively much shorter.

*Coxae.* Essentially as in the female but the internal spur on coxa I is shorter.

*Spiracular plate.* Oval with the longer axis longitudinal. Macula a little ecentric on the antero-ventral side. Length, 0.268 mm.; width, 0.221 mm.

*Sexual opening.* At the level of coxae III.

## Nymph

*Capitulum.* Basis broad with the posterior edge salient and nearly straight. Cornua definite, small, divergent, slightly elevated over the level of the posterior margin and often with the elevation extending forward. Surface impunctate, shagreened. Palpi long, laterally straight, medially curved. Article 1 simple in dorsal view. Hairs few. In ventral view basis is long, waisted at the middle, broadly rounded and salient behind. Auriculae as mild lateral extensions. Article 1 of the palpus with a faint ventral tooth.

*Hypostome.* Rounded apically. Denticles first 3/3 and then 2/2 with the lateral teeth pointed and larger, the medians rounded and progressively smaller to the median line. Length about 0.19 mm.

*Scutum*. Sub-circular, slightly wider than long. Scapulae short and rounded. Lateral carinae faint, nearly straight. Cervical grooves distinct, first convergent and then divergent, fading out before reaching the postero-lateral margins. Surface shagreened. Punctations few and small. Hairs few and small.

*Legs*. Essentially as in the male and female. Metatarsus on leg I about half as long as the tarsus.

*Coxae*. Essentially as in the male.

*Spiracular plate*. Sub-circular with the longer axis transverse. Porose central. Goblets few and scattered. Length, 0.134 mm., width, 0.115 mm.

*Holotype* (female), *allotype* (male) and *paratypes* all from A. P. 8096, a lot of 5 females and 6 males collected from vegetation, MONTEREY COUNTY, CALIFORNIA, March 16, 1932. Also 8 paratype nymphs, A. P. 20022, from Vancouver, B. C., reared by Mr. J. D. Gregson.

Holotype and allotype, paratypes of adults and paratype nymphs are deposited in the collections of the Rocky Mountain Laboratory, Hamilton, Montana. Paratype adults and nymphs are placed in the United States National Museum, Washington, D. C.; Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; Division of Entomology and Parasitology, University of California, Berkeley, California.

The nymphs of *pacificus* may be readily distinguished from those of *californicus* by several characters including their very small, ridge-like auriculae. In *californicus* they are large, triangular, and protrude laterally.

The adults of *pacificus* differ from those of *I. scapularis* Say, 1821, in several respects. The absence of cornua in the *pacificus* female and the much smaller spiracular plates in the male will serve to separate the two species. Furthermore, *pacificus* is known only from coastal regions of British Columbia and Western United States as far south as San Diego, California. It undoubtedly extends south into Lower California. *Scapularis*, however, is widely distributed in much of the Southeastern United States and it has also been reported from near Tampico, Mexico.

### *Ixodes conepati* Cooley and Kohls, new species

#### Female

Described from holotype (unengorged) and one paratype (a little engorged).

*Body.* Color well sclerotized parts brown-black. Length (tips of scapulae to posterior extremity), 4.05 mm.; width, 2.25 mm. Oval, widest at about the middle. Color, yellow-brown. Scutum reaching about half the length. Postscutal area smooth, striate, and with numerous hairs which are similar to those on the marginal folds.

*Capitulum.* Length (cornua to tip of hypostome), 0.9 mm.; width of basis (dorsum back of palpi), 0.66 mm. Sides either curved or straight and slightly convergent behind. Cornua distinct, moderately rounded, and at about the same level as the salient posterior margin. Porose areas large, depressed and well separated. Surface smooth, shining, and faintly shagreened. Inner plate of palpal article 1 visible as a small button. Article 2 longer than 3; combined length, 0.95 mm.; greatest width, 0.21 mm. Laterally straight, medially curved; widest across article 2. Hairs few and small. In ventral view basis is broad, slightly convex, broadly rounded and salient behind. Auriculae absent. Transverse sutural line visible. Palpi flattened medially. Inner plate on article 1 visible as a small sub-oval plate.

*Hypostome.* Long with sides nearly parallel, apex rounded. Denticles 3/3 for about the terminal one-third, then 2/2 to the base. Denticles progressively smaller from the laterals to the median line. Length about 0.51 mm.

*Scutum.* Length, 1.8 mm.; width, 1.68 mm. A little longer than wide, widest in front of the middle; rounded behind. Scapulae long, thin and pointed. Lateral carinae distinct and curved, starting at the scapulae and nearly reaching the postero-lateral margins; more precipitous on the median than on the lateral sides. Cervical grooves shallow, indefinite, first convergent then divergent, and reaching posteriorly to opposite the termini of the carinae. Punctations numerous, moderate in size. Surface faintly shagreened, shining. Hairs very few and short (negligible).

*Legs.* Long and small. All tarsi terminating abruptly with sub-apical dorsal humps only moderate. Ventral hairs more numerous and coarser on leg IV than on I. Length of tarsis I, 0.75 mm.; metatarsus, 0.61 mm. Length of tarsus IV, 0.75 mm.; metatarsus, 0.72 mm.

*Coxae.* Coxae II, III, and IV mildly convex; salient on the posterior margins. Internal spur on I long, thin, and pointed; absent on all others. External spurs on all coxae short, rounded, and all about equal. A few hairs on all coxae.

*Spiracular plate.* Large, nearly circular, with the slightly longer axis transverse. Surface a little elevated over that of the body, faintly convex. Goblets numerous and large. Size 0.37 mm. by 0.35 mm.

*Sexual opening.* Situated between coxae III.

The specimen included as a paratype, differs from the holotype in having the palpi shorter (articles 2 and 3, 0.69 mm.), in hav-

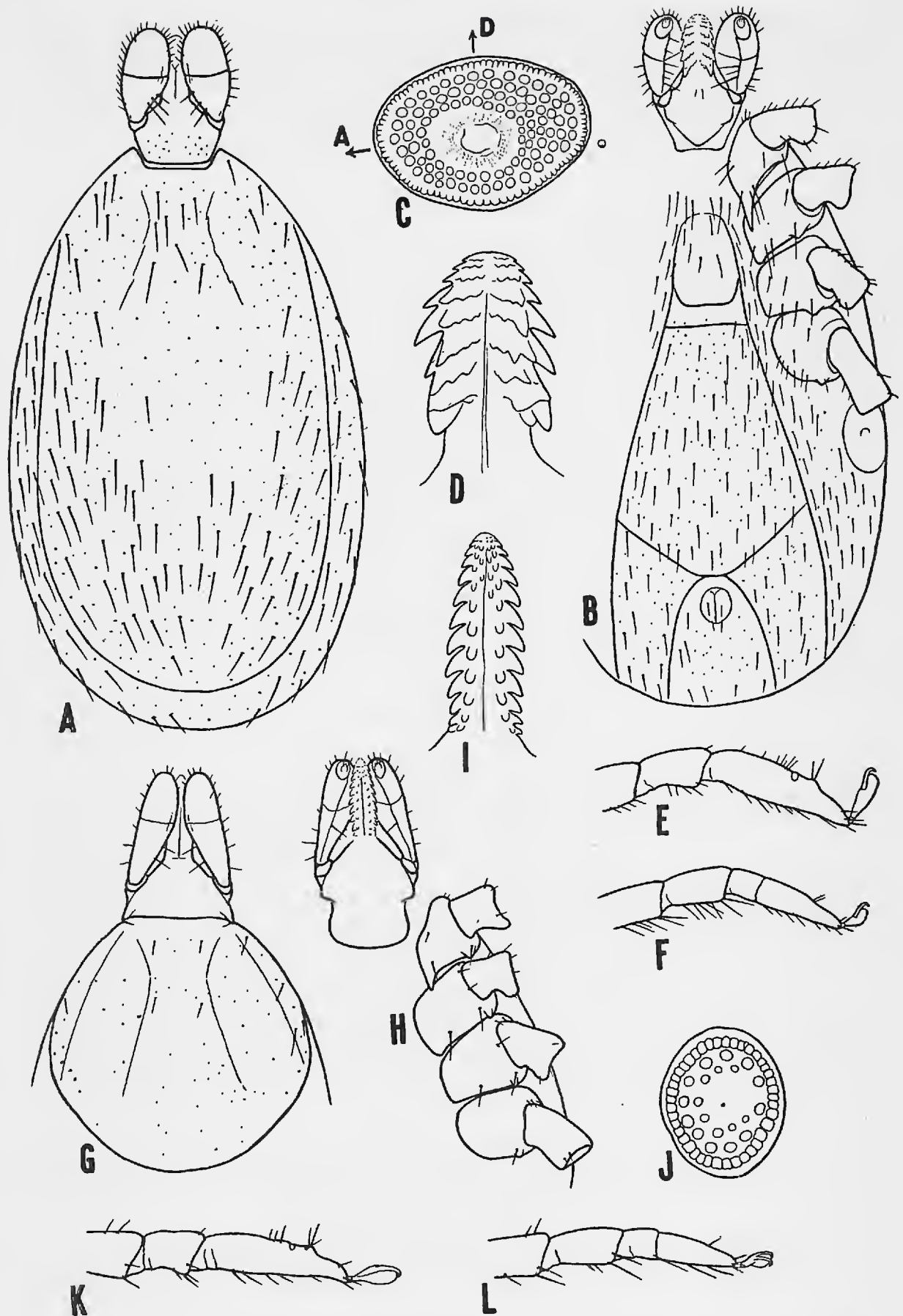


Figure 3. Female *Ixodes coneptati* Cooley and Kohls. A. Capitulum and scutum, dorsal. B. Capitulum and coxae, ventral. C. Spiracular plate. D. Hypostome. E. Tarsus and metatarsus of leg I. F. Tarsus and metatarsus of leg IV.



ing the posterior margin of the basis a little depressed below the level of the cornua, and in having the scutum wider than long (length 1.71 mm., width 1.8 mm.). Closely related species have similar variations. The hypostome is lacking in the paratype.

Male unknown.

*Holotype*. Female, A. P. 17256, from a cave near NEW BRAUNFELS, TEXAS, September 13, 1940. Cave was evidently frequented by various animals.

*Paratype*. Female, A. P. 18440, from *Conepatus* sp., BREWSTER COUNTY, TEXAS, March, 1940.

Holotype deposited in the collections of the Rocky Mountain Laboratory. Paratype deposited in the United States National Museum.

The species is closely related to *marmotae* Cooley and Kohls, 1938, and *cookei* Packard, 1869. From *marmotae* it differs in lacking auriculae entirely and from both in being larger, in having longer legs and relatively longer palpi and hypostome. *I. coneptati* is known only from southern Texas, *cookei* only from Eastern States, and *marmotae* only from Western States.

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#### SUMAC-GALL APHID, MELAPHIS RHOIS (FITCH), IN ARIZONA

This very interesting aphid was collected in Cave Creek Canyon, Chiricahua Mountains, Arizona, August 22, 1943, on smooth, scarlet, or red sumac, *Rhus glabra* L., by Dr. Wyatt W. Jones. He described the galls as follows: "I was somewhat surprised to see very large, sac-like galls on reddish leaves and to find hundreds of small winged aphids within. The galls were apparently always within one-half inch of the base of the leaflet and very close to the mid-vein, but not attached to it. In general the galls are bladder-shaped, but more or less irregular. Some were larger in diameter than three-fourths of an inch."

This is primarily an eastern species and I have been able to find printed reports of its occurrence in New York (Fitch, 1886), Illinois (Walsh, 1866), Minnesota (Oestlund, 1887), New Jersey (Smith, 1890), Iowa (Osburn, 1892) Ohio (Cook, 1904, by Jackson, 1908), Kansas (Sanborn, 1906), Connecticut (Patch, 1923), North Carolina (Brimley, 1938). I also have mounted specimens from Ottawa, Canada (Ross, 1916), South Carolina (Nettles, 1933), and Pennsylvania (Pepper, 1938).—E. O. ESSIG.